

# TCM-20DV/21DV/ 22DV/23DV

## SERVICE MANUAL

Ver 1.0 2000. 02



Photo: TCM-20DV

**US Model**

TCM-20DV/21DV/22DV/23DV

**Canadian Model**

TCM-20DV/22DV

**AEP Model**

TCM-20DV/21DV

**E Model**

TCM-20DV/23DV

**Chinese Model**

TCM-20DV

|                                    |             |
|------------------------------------|-------------|
| Model Name Using Similar Mechanism | NEW         |
| Tape Transport Mechanism Type      | MT-20DV-118 |

### SPECIFICATIONS

|   |   |
|---|---|
| <b>Recording system</b>   | 2-track 1 channel monaural  |
| <b>Tape speed</b>   | 4.8 cm/s or 2.4 cm/s  |
| <b>Frequency range</b>  | 250 - 6,300 Hz using nomal (TYPE I) cassette (with REC TIME switch at "NORMAL")                 |
| <b>Speaker</b>  | Approx. 3.6 cm (1 7/16 in.) dia.  |
| <b>Power output</b>   | 250 mW (at 10 % harmonic distortion)  |
| <b>Input</b>  | Microphone input jack (minijack) sensitivity 0.2 mV for 3 kilohms or lower impedance microphone |
| <b>Output</b>   | Earphone jack (minijack) for 8 - 300 ohms earphone  |
| <b>Variable range of the tape speed</b>                         | From approx. +30% to -15% (with REC TIME switch at "NORMAL")                                    |
| <b>Power requirements</b>                                       | 3 V DC batteries R6 (AA) × 2/<br>External DC 3 V power sources                                  |
| <b>Dimensions (w/h/d) (incl. projecting parts and controls)</b> | Approx. 112 × 36.6 × 90.3 mm<br>(4 1/2 × 1 1/2 × 3 5/8 in.)                                     |
| <b>Mass</b>   | Approx. 175 g (6.2 oz.)   |

### Supplied accessories

The instructions in this manual are for 4 models.  
The TCM-20DV is the model used for illustration purposes.

| TCM-  | 23DV | 22DV | 21DV | 20DV |
|---|------|------|------|------|
| AC power adaptor (1)  | —    | ○    | —    | —    |
| Battery charger adaptor (1)                                   | —    | ○    | —    | —    |
| Rechargeable batteries (2)<br>(NC-AA, 1.2V, 700mAh,<br>Ni-Cd) | —    | ○    | —    | —    |
| Cassette tape C-90 (1)  | —    | —    | ○    | —    |
| Battery LR6 (2)   | —    | —    | ○    | —    |
| Monaural microphone (1)                                       | —    | —    | ○    | —    |
| Super-directional<br>microphone (1)                           | ○    | —    | —    | —    |
| Carrying pouch (1)  | —    | —    | ○    | —    |
| Hand strap (1)<br>(attached to the unit)                      | ○    | ○    | ○    | ○    |

### Battery life (Approx. hours) (EIAJ\*)

|   | Playback | Recording |
|---|----------|-----------|
| Sony alkaline<br>LR6 (SG)   | 11       | 11        |
| Sony R6P (SR)   | 3        | 3         |
| Sony<br>rechargeable<br>battery<br>(NC-AA) fully<br>charged (TCM-<br>22DV only) | 3        | 3         |

\* Measured value by the standard of EIAJ (Electronic Industries Association of Japan). (Using a Sony HF series cassette tape and playing back with speakers)

### Note

The battery life may shorten depending on the operation of the unit.

For maximum performance we recommend that you use alkaline batteries.

**CASSETTE-CORDER**

**SONY®**

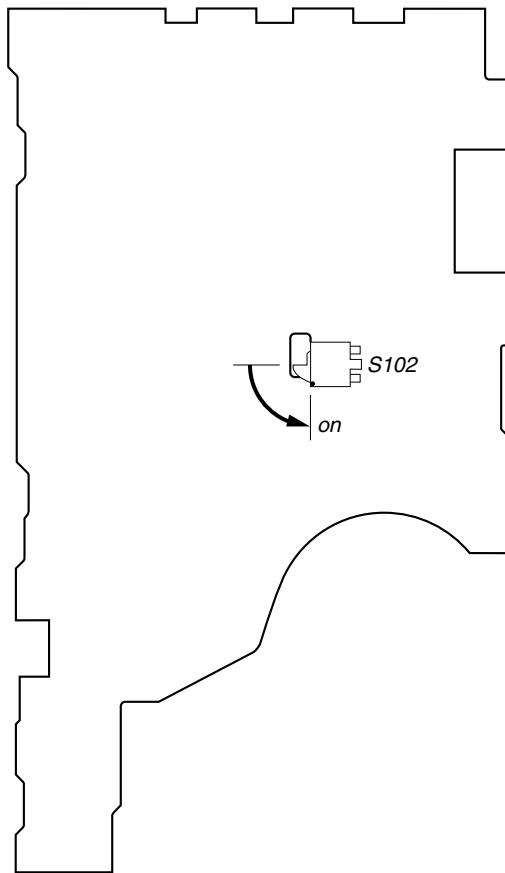
## SECTION 1 SERVICING NOTES

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In this set, the S102 (POWER) detects REC/PLAYBACK on. It is mounted on the MAIN board, and therefore the REC/PLAYBACK on cannot be detected with the MAIN board removed. When making an operation check and voltage check of mechanical deck with the MAIN board removed, fix the S102 at turn on.

#### – MAIN BOARD (Conductor Side) –



#### SAFETY-RELATED COMPONENT WARNING!!

COMPONENTS IDENTIFIED BY MARK  $\triangle$  OR DOTTED LINE WITH MARK  $\triangle$  ON THE SCHEMATIC DIAGRAMS AND IN THE PARTS LIST ARE CRITICAL TO SAFE OPERATION. REPLACE THESE COMPONENTS WITH SONY PARTS WHOSE PART NUMBERS APPEAR AS SHOWN IN THIS MANUAL OR IN SUPPLEMENTS PUBLISHED BY SONY.

#### ATTENTION AU COMPOSANT AYANT RAPPORT À LA SÉCURITÉ!

LES COMPOSANTS IDENTIFIÉS PAR UNE MARQUE  $\triangle$  SUR LES DIAGRAMMES SCHÉMATIQUES ET LA LISTE DES PIÈCES SONT CRITIQUES POUR LA SÉCURITÉ DE FONCTIONNEMENT. NE REMPLACER CES COMPOSANTS QUE PAR DES PIÈCES SONY DONT LES NUMÉROS SONT DONNÉS DANS CE MANUEL OU DANS LES SUPPLÉMENTS PUBLIÉS PAR SONY.

#### Flexible Circuit Board Repairing

- Keep the temperature of the soldering iron around 270 °C during repairing.
- Do not touch the soldering iron on the same conductor of the circuit board (within 3 times).
- Be careful not to apply force on the conductor when soldering or unsoldering.

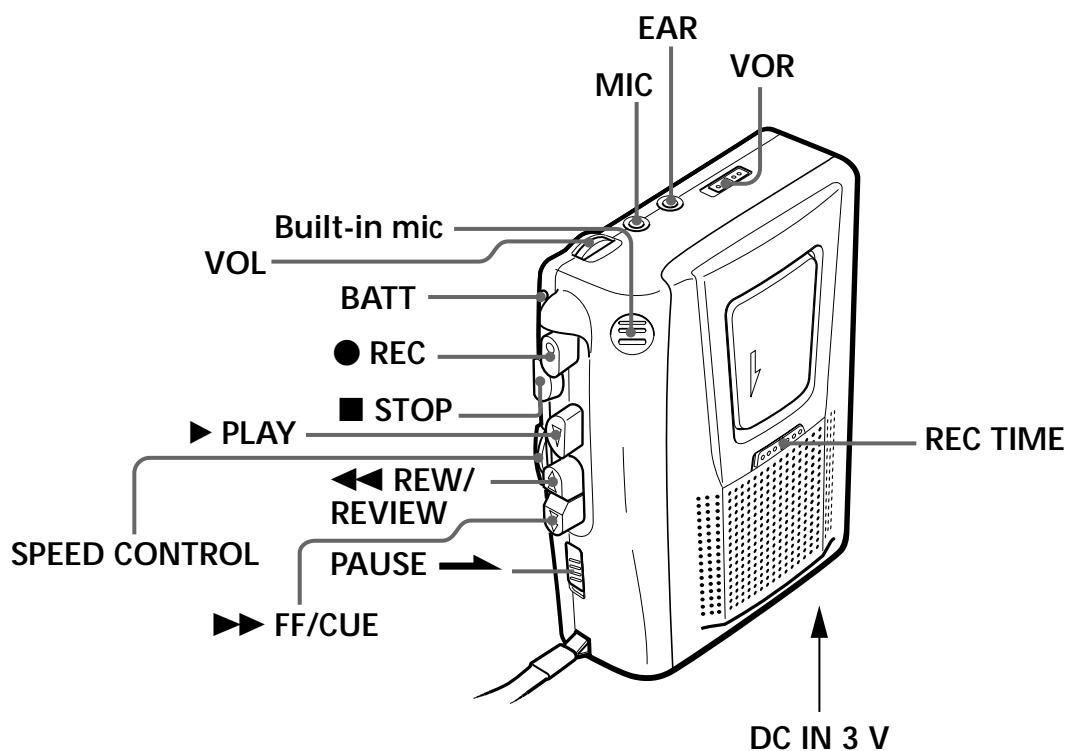
#### Notes on chip component replacement

- Never reuse a disconnected chip component.
- Notice that the minus side of a tantalum capacitor may be damaged by heat.

## SECTION 2 GENERAL

This section is extracted from  
instruction manual.

- Location of Controls



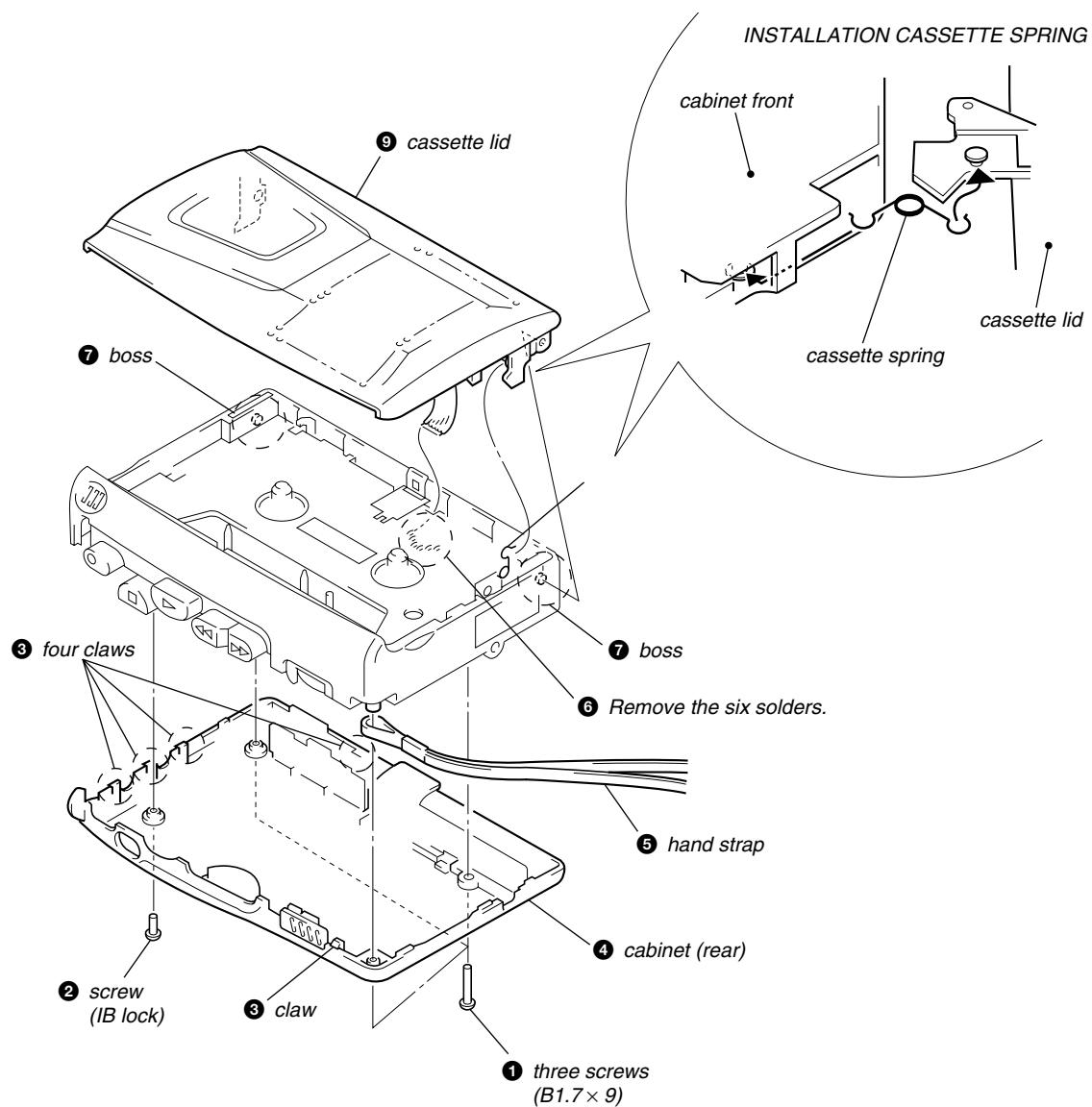
## SECTION 3 DISASSEMBLY

- This set can be disassembled in the order shown below.

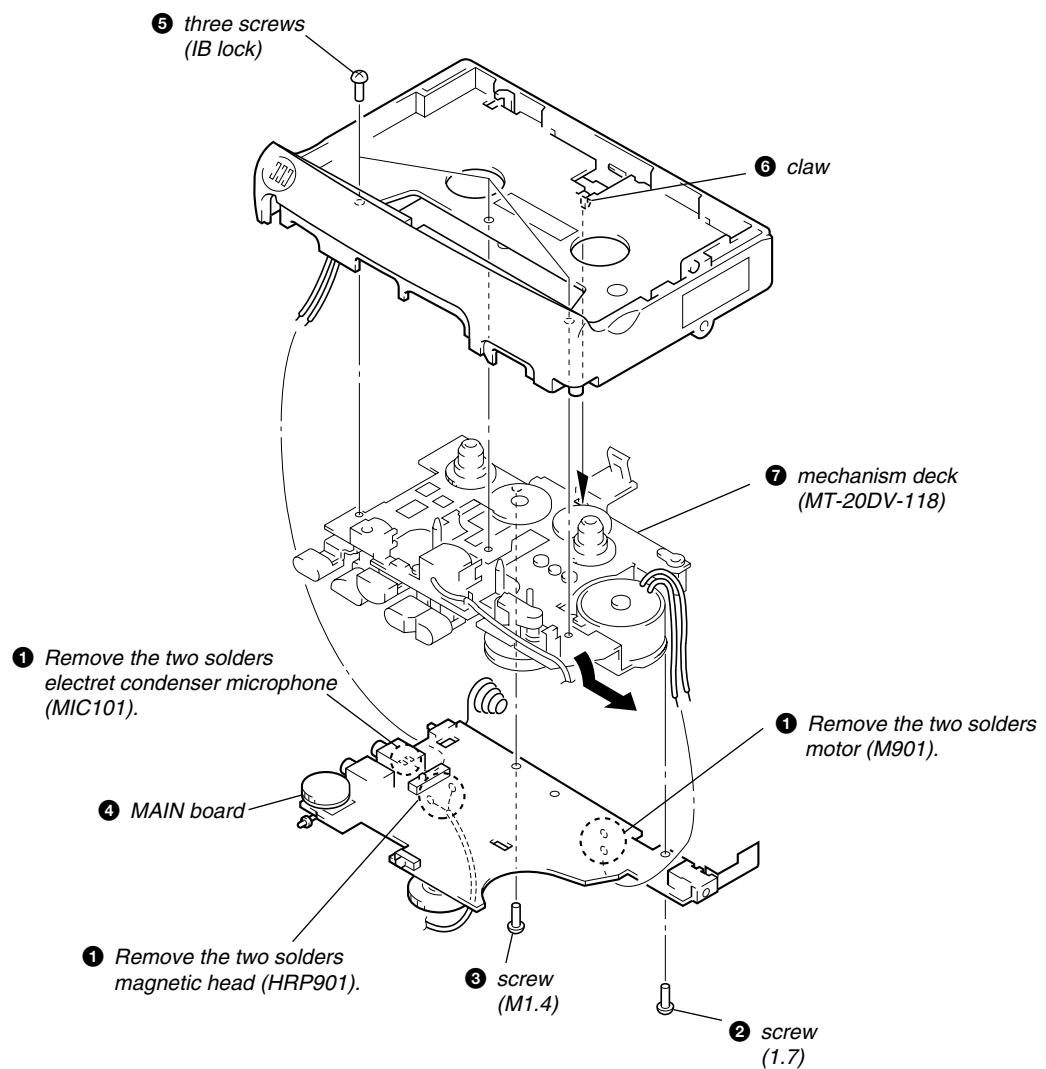
SET → CABINET (REAR), CASSETTE LID → MAIN BOARD, MECHANISM DECK (MT-20DV-118) → BELT

**Note:** Follow the disassembly procedure in the numerical order given.

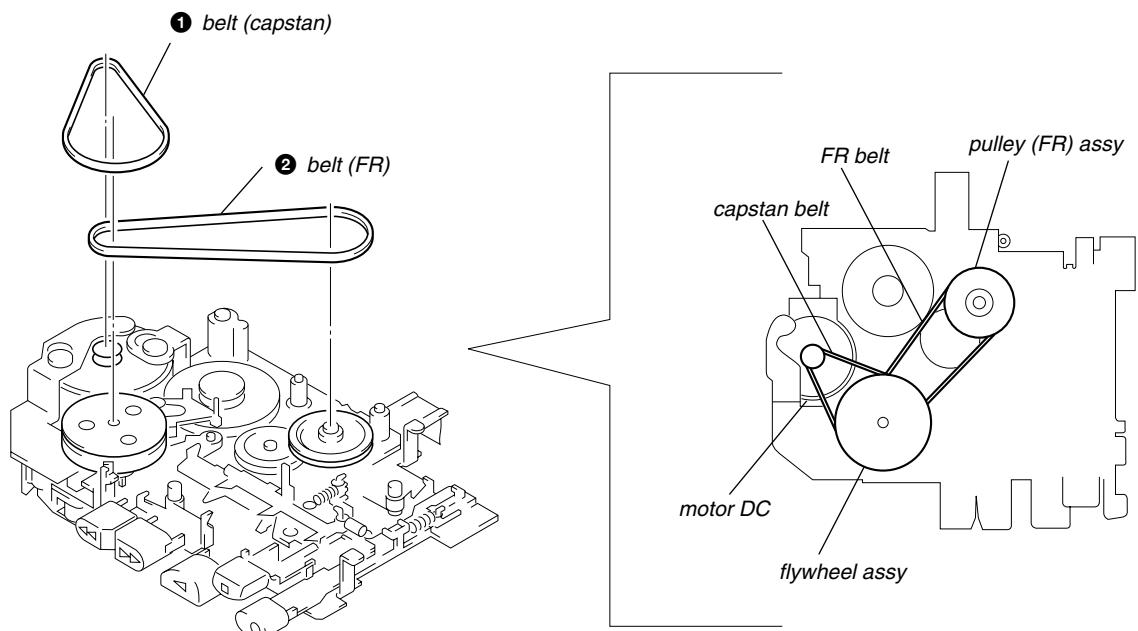
### CABINET (REAR), CASSETTE LID



## MAIN BOARD, MECHANISM DECK (MT-20DV-118)

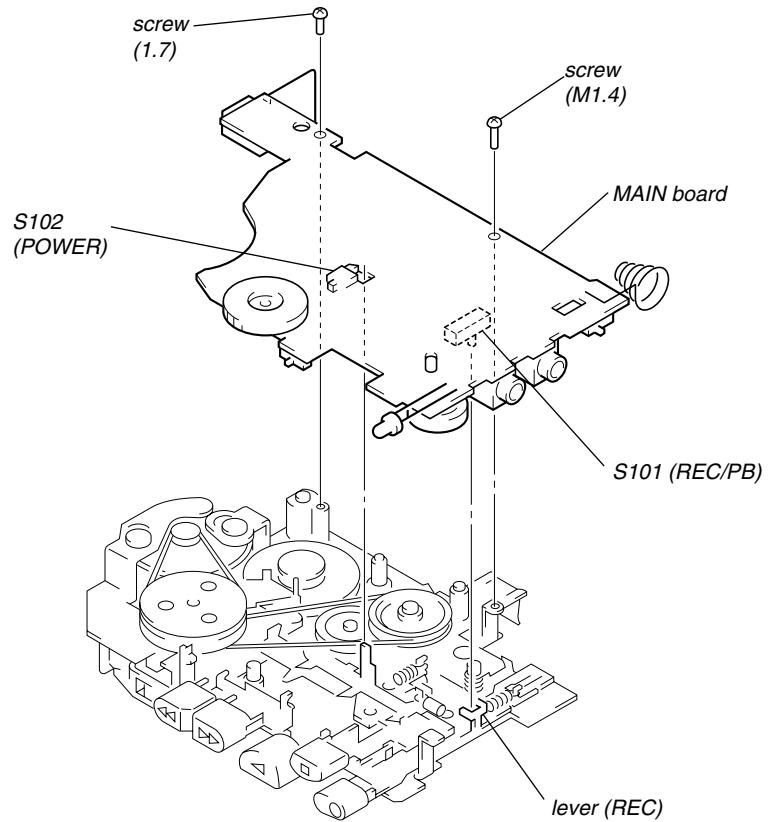


## BELT



## INSTALLATION MAIN BOARD

On installation MAIN board, adjust to the S101 and the S102.



## SECTION 4

### MECHANICAL ADJUSTMENTS

1. Clean the following parts with a denatured-alcohol-moistened swab:

|                      |              |
|----------------------|--------------|
| record/playback head | pinch roller |
| erase head           | rubber belt  |
| capstan              | idle         |
2. Demagnetize the record/playback head with a head demagnetizer. (Do not bring the head demagnetizer close to the erase head.)
3. Do not use a magnetized screwdriver for the adjustments.
4. After the adjustments, apply suitable locking compound to the parts adjusted.
5. The adjustments should be performed with the rated power supply voltage (2.5 V) unless otherwise noted.

#### Torque Measurement

| Mode                | Torque Meter | Meter Reading  |
|---------------------|--------------|--|
| FWD                 | CQ-102C      | 2.16 - 4.7 mN•m<br>(22 - 48 g•cm)<br>(0.31 - 0.67 oz•inch)   |
| FWD<br>Back Tension |              | 0.05 - 0.29 mN•m<br>(0.5 - 3 g•cm)<br>(0.007 - 0.04 oz•inch) |
| FF                  | CQ-201B      | 4.90 mN•m<br>(more than 50 g•cm)                             |
| REW                 |              | (more than 0.69 oz•inch)                                     |

#### Tape Tension Measurement

| Mode | Torque Meter | Meter Reading  |
|------|--------------|--|
| FWD  | CQ-403C      | 4.90 mN•m<br>(more than 50 g)<br>(more than 1.76 oz) |

## SECTION 5

### ELECTRICAL ADJUSTMENTS

#### Setting:

- Supplied voltage: 2.5 V
- Switch and control position
  - VOL** control (RV101) : mechanical center
  - PAUSE** switch (S105) : OFF
  - SPEED CONTROL** (RV602): center click
  - VOR** switch (S104) : OFF

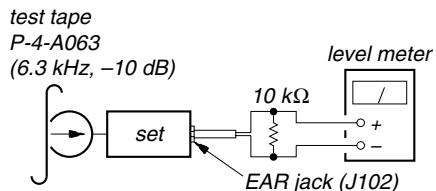
#### Test Tape

| Type     | Signal          | Used for                |
|----------|-----------------|-------------------------|
| P-4-A063 | 6.3 kHz, -10 dB | Head Azimuth Adjustment |
| WS-48A   | 3 kHz, 0 dB     | Tape Speed Adjustment   |

0 dB=0.775 V

#### Record/Playback Head Azimuth Adjustment

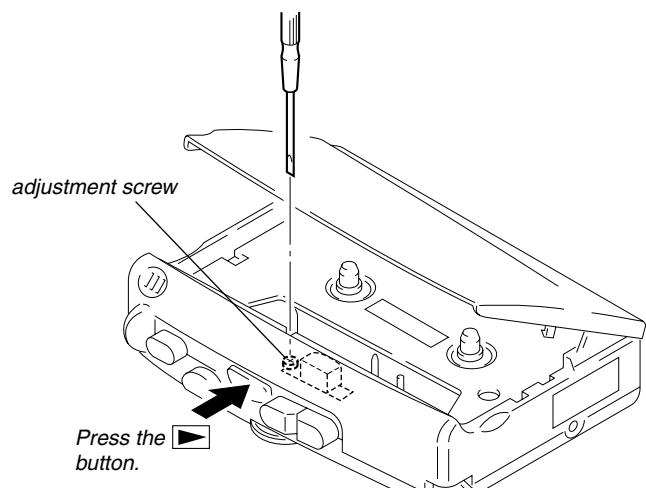
Mode: playback



#### Procedure:

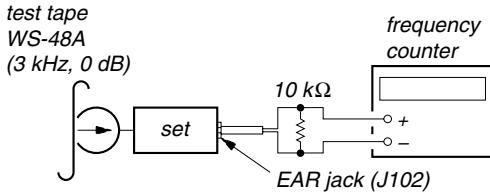
- Turn the adjustment screw to obtain the maximum reading on level meter.
- Note:** Several peaks may appear, but take the maximum.
- After the adjustment, lock the adjustment screw with suitable locking compound.

#### Adjustment Location:



#### Tape Speed Adjustment

Mode: playback



#### Procedure:

##### – Normal Speed –

- Set **REC TIME** switch (S601) to NORMAL (4.8 cm/s) position, and playback the tape (WS-48A).
- Adjust RV601 so that frequency counter reading becomes 3,040 Hz.

**Specification values:** 3,030 to 3,050 Hz

##### – Double Speed –

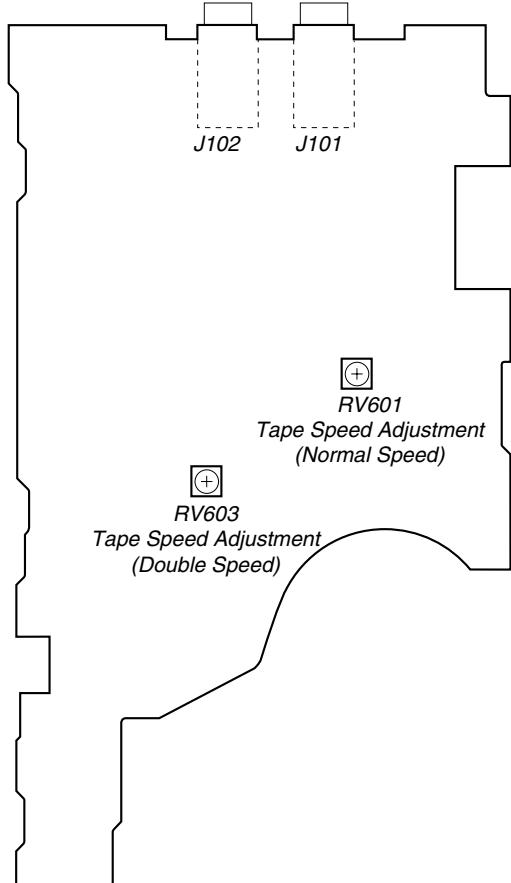
- Set **REC TIME** switch (S601) to DOUBLE (2.4 cm/s) position.
- Playback the tape from the beginning for two minutes, then adjust RV603 so that frequency counter reading becomes 1,540 Hz.

**Specification values:** 1,535 to 1,545 Hz

Confirm that deflection of the frequency counter reading between the beginning and the end of tape is within 1% (NORMAL: approx. 30.4 Hz, DOUBLE: approx. 15.4 Hz).

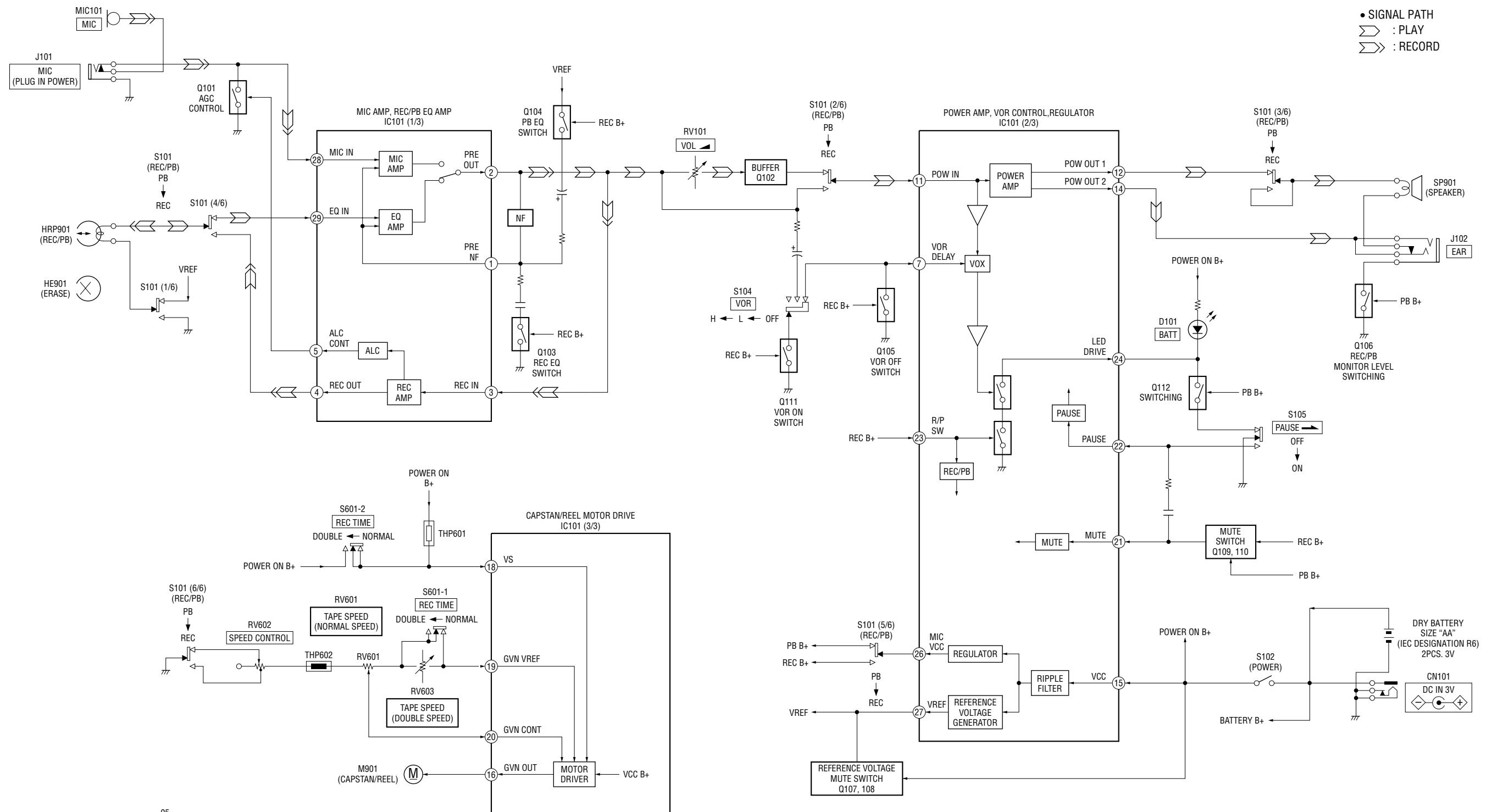
#### Adjustment Location:

##### – MAIN BOARD (Conductor Side) –

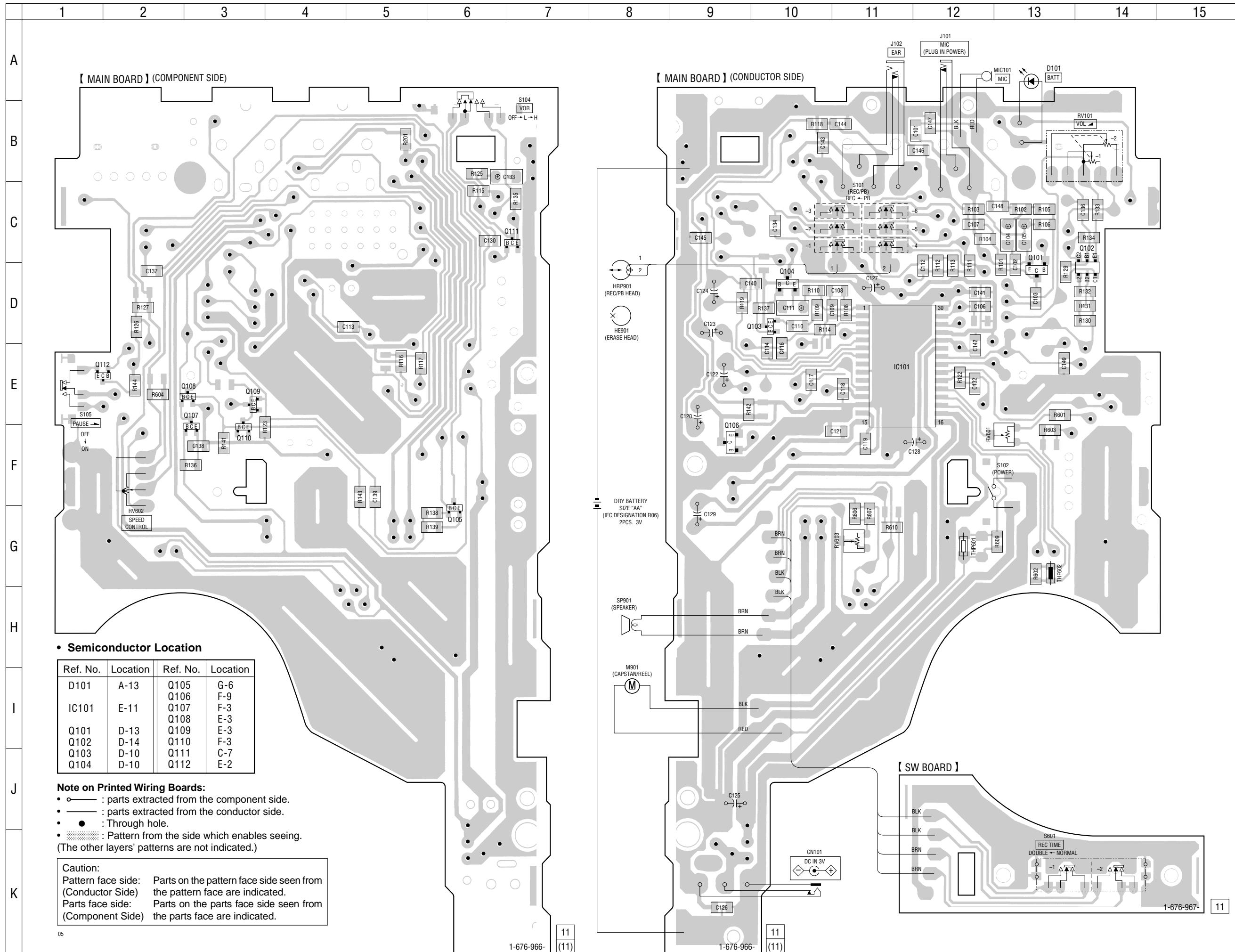


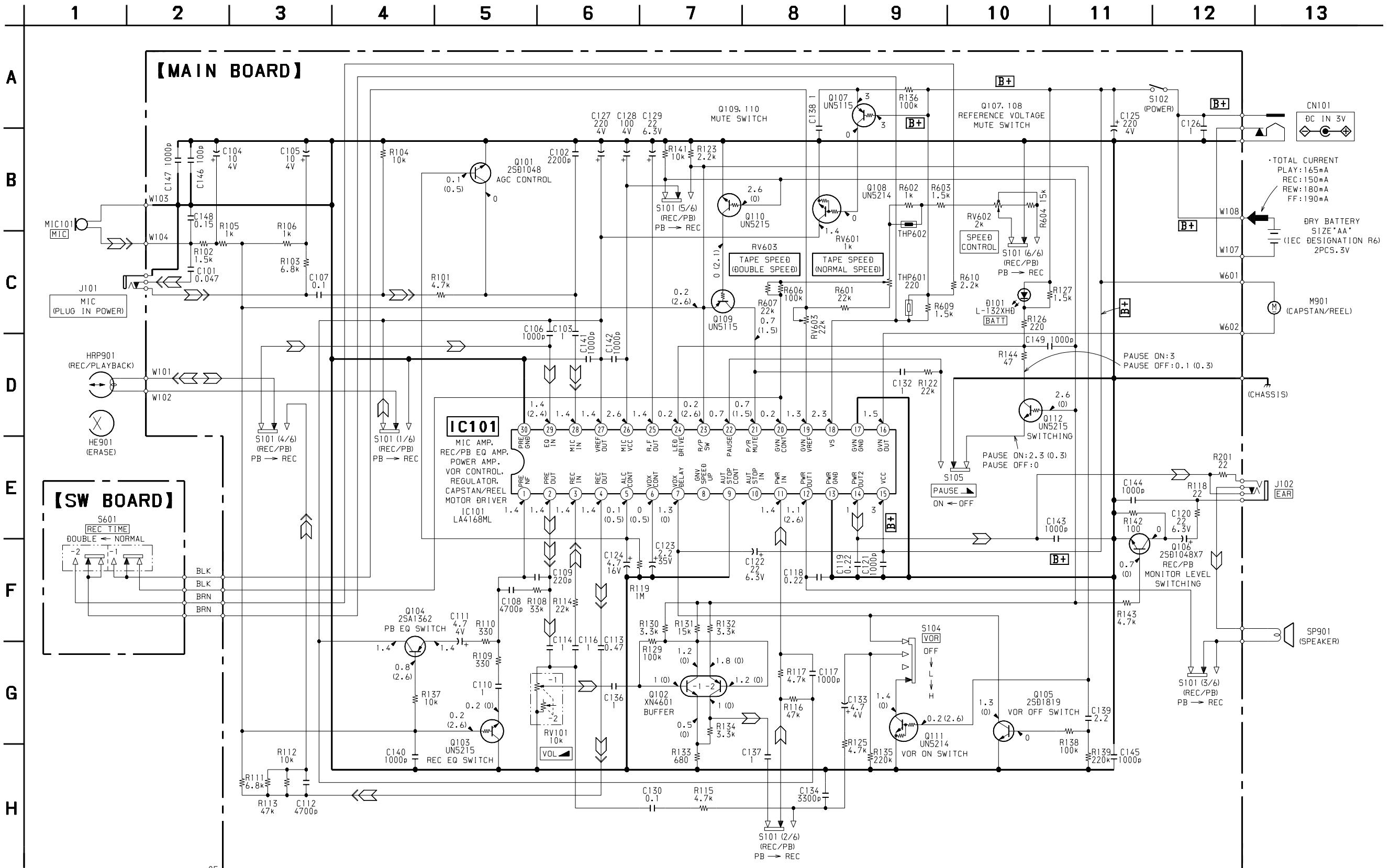
## SECTION 6 DIAGRAMS

### 6-1. BLOCK DIAGRAM



## 6-2. PRINTED WIRING BOARDS





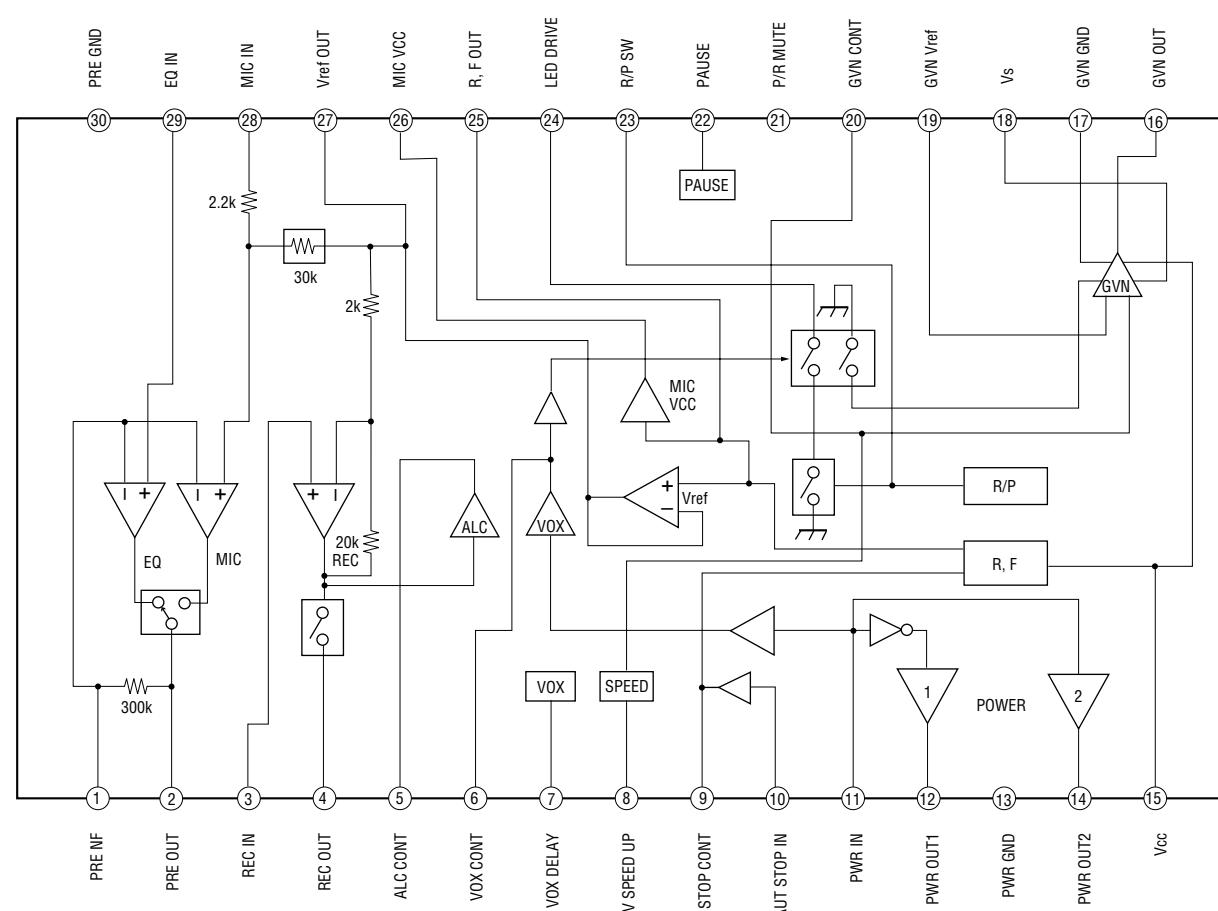
### Note on Schematic Diagram:

- All capacitors are in  $\mu\text{F}$  unless otherwise noted.  $\text{pF}$ :  $\mu\text{F}$  50  $\text{WV}$  or less are not indicated except for electrolytics and tantalums.
- All resistors are in  $\Omega$  and  $1/4 \text{ W}$  or less unless otherwise specified.
-  : panel designation.
-  : B+ Line.
-  : adjustment for repair.
- Total current is measured with no cassette installed.
- Power voltage is dc 3 V and fed with regulated dc power supply from external power voltage jack.
- Voltages are dc with respect to ground under no-signal conditions.
  - no mark : PLAY
  - $< >$  : RECORD
- Voltages are taken with a VOM (Input impedance  $10 \text{ M}\Omega$ ). Voltage variations may be noted due to normal production tolerances.
- Signal path.
  - $\Sigma$  : PLAY
  - $\Sigma\Sigma$  : RECORD

## SECTION 7 EXPLODED VIEWS

### • IC Block Diagram

IC101 LA4168ML-TE-L



### NOTE:

- -XX and -X mean standardized parts, so they may have some difference from the original one.

- Color Indication of Appearance Parts

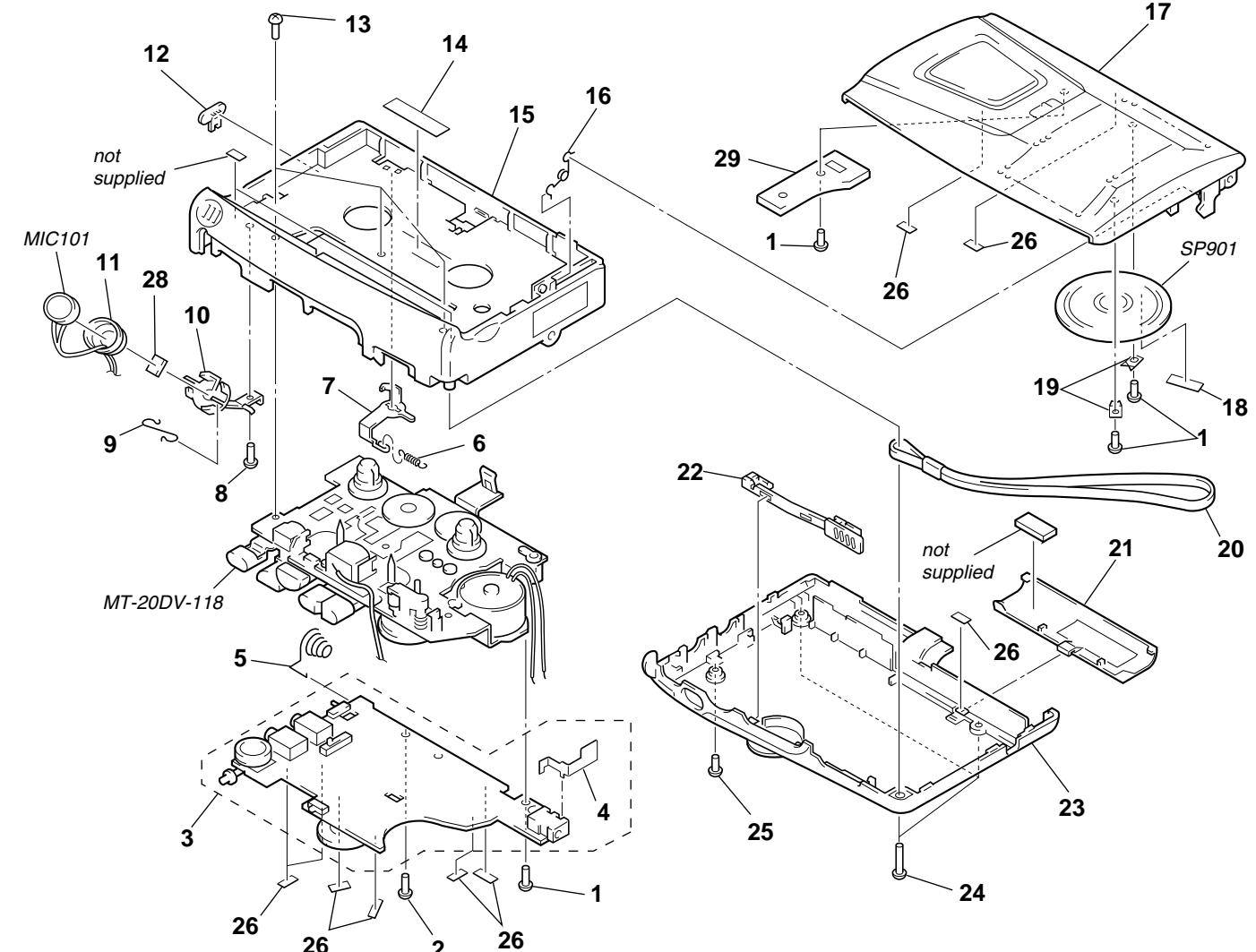
Example:  
KNOB, BALANCE (WHITE) . . . (RED)

↑  
Parts Color Cabinet's Color

- Abbreviation

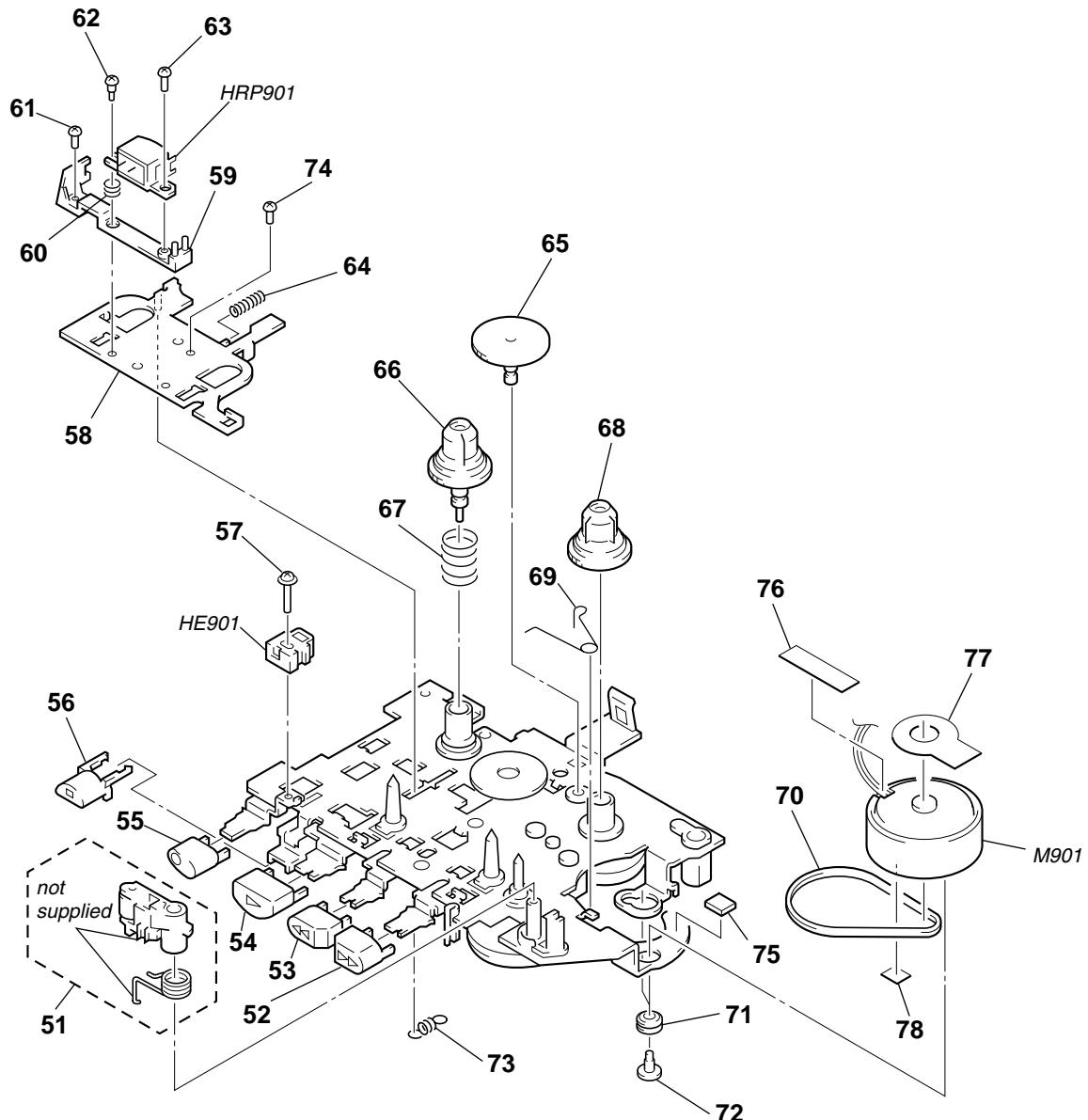
1E: No indication of country of origin

### (1) CABINET SECTION



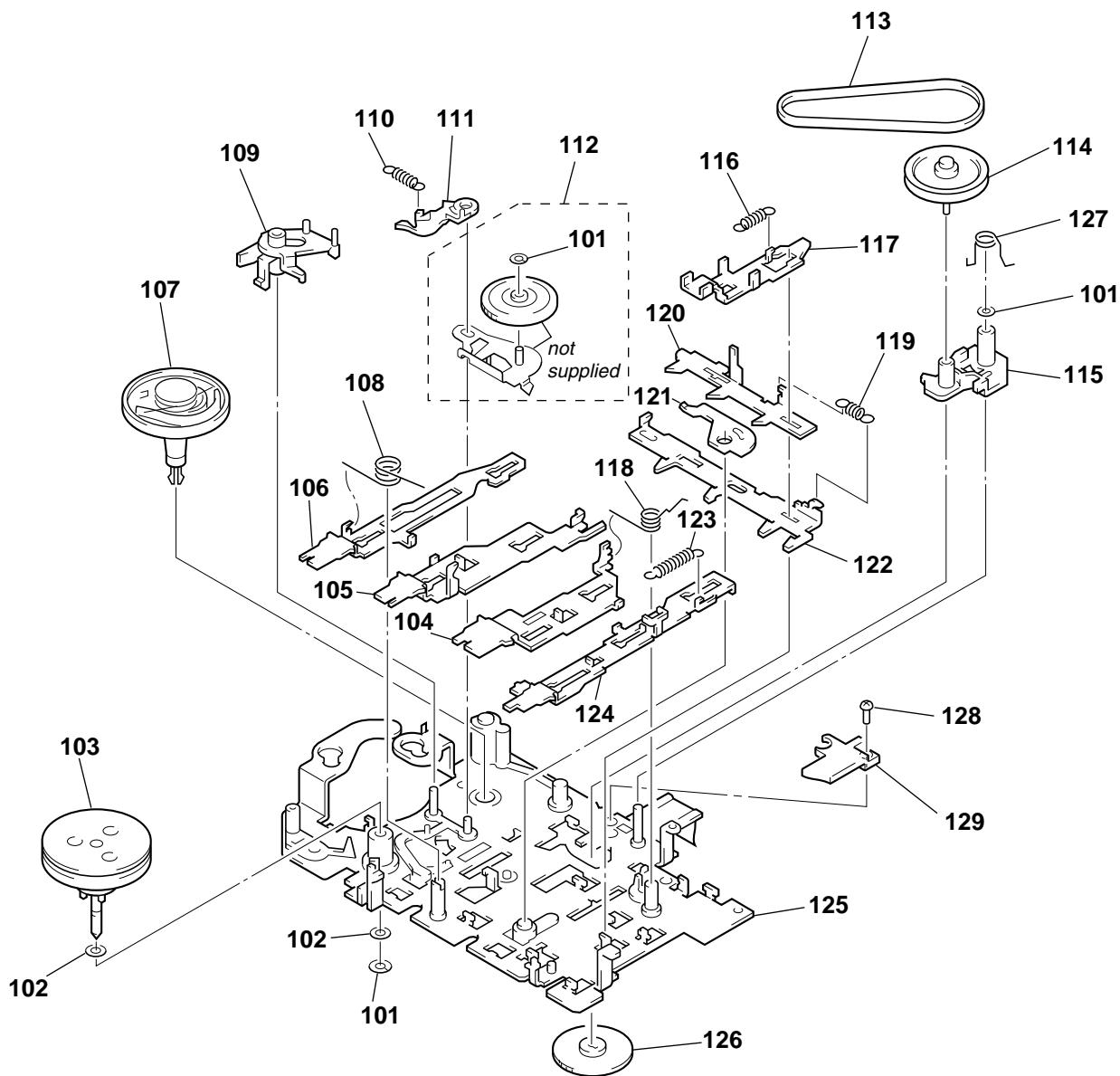
| Ref. No. | Part No.     | Description                         | Remark | Ref. No. | Part No.     | Description                     | Remark |
|----------|--------------|-------------------------------------|--------|----------|--------------|---------------------------------|--------|
| 1        | 3-318-382-31 | SCREW (1.7), TAPPING                |        | 16       | 3-924-739-01 | SPRING, CASSETTE                |        |
| 2        | 3-345-648-01 | SCREW (M1.4), TOOTHED LOCK          |        | 17       | X-4952-666-1 | LID ASSY, CASSETTE              |        |
| * 3      | A-3021-314-A | MAIN BOARD, COMPLETE                |        | 18       | 4-017-441-01 | CUSHION (B)                     |        |
| 4        | 3-924-741-01 | TERMINAL, PLUS                      |        | * 19     | 3-924-757-01 | BRACKET (SPEAKER)               |        |
| 5        | 3-936-973-01 | TERMINAL, MINUS                     |        | 20       | 3-328-319-01 | STRAP, HAND                     |        |
| 6        | 3-924-744-01 | SPRING (CLAW DETECTION), TENSION    |        | 21       | 3-924-749-21 | LID, BATTERY CASE               |        |
| 7        | 3-924-743-01 | CLAW, ERASING PROTECTION            |        | 22       | 3-924-747-21 | KNOB (PAUSE)                    |        |
| 8        | 3-334-565-41 | SCREW (B1.7), TAPPING               |        | 23       | 3-019-597-11 | CABINET (REAR)                  |        |
| 9        | 3-924-745-01 | BAR, GROUND                         |        | 24       | 3-318-203-92 | SCREW (B1.7X9), TAPPING         |        |
| 10       | 3-924-740-01 | HOLDER, MICROPHONE                  |        | 25       | 3-366-890-51 | SCREW (IB LOCK)                 |        |
| 11       | 3-924-763-01 | CUSHION (MICROPHONE)                |        | 26       | 3-831-441-99 | CUSHION                         |        |
| 12       | 3-924-742-21 | KNOB (VOR)                          |        | 28       | 3-831-441-11 | CUSHION, CABINET UPPER 10X7X0.5 |        |
| 13       | 3-939-590-26 | SCREW (IB LOCK)                     |        | * 29     | 1-676-967-11 | SW BOARD                        |        |
| 14       | 3-578-101-31 | PLATE, ORNAMENTAL                   |        | SP901    | 1-505-838-11 | SPEAKER (3.6cm)                 |        |
| 15       | 3-019-364-33 | CABINET (FRONT) (20DV: 1E/23DV: 1E) |        | MIC101   | 1-542-136-11 | MICROPHONE, ELECTRET CONDENSER  |        |
| 15       | 3-019-364-43 | CABINET (FRONT) (20DV: 1E/23DV: 1E) |        |          |              |                                 |        |

**(2) MECHANISM DECK SECTION-1  
(MT-20DV-118)**



| Ref. No. | Part No.     | Description                   | Remark | Ref. No. | Part No.     | Description                            | Remark |
|----------|--------------|-------------------------------|--------|----------|--------------|--|--------|
| 51       | X-3377-250-1 | LEVER, (2) ASSY, PINCH        |        | 67       | 3-924-674-01 | SPRING (B. T), COMPRESSION             |        |
| 52       | 3-925-146-01 | BUTTON (FF) (▶▶)              |        | 68       | 3-924-641-01 | GEAR (T REEL)                          |        |
| 53       | 3-925-147-01 | BUTTON (REW) (◀◀)             |        | 69       | 3-924-726-01 | SPRING (M GROUND), TORSION             |        |
| 54       | 3-925-148-01 | BUTTON (PLAY) (▶)             |        | 70       | 3-907-943-01 | BELT (CAPSTAN)                         |        |
| 55       | 3-925-145-01 | BUTTON (REC) (●)              |        | 71       | 3-925-109-01 | CUSHION (MOTOR)                        |        |
| 56       | 3-924-738-01 | BUTTON (STOP) (■)             |        | 72       | 3-925-108-01 | SCREW (MOTOR)                          |        |
| 57       | 3-703-925-21 | SCREW (M1.4)                  |        | 73       | 3-924-644-01 | SPRING (POWER TENSION), TENSION        |        |
| 58       | 3-924-625-01 | LEVER (HEAD)                  |        | 74       | 3-348-160-11 | SCREW (M1.4X1.6), PRECISION PAN        |        |
| 59       | 3-924-645-01 | BRACKET (HEAD)                |        | 75       | 3-927-754-11 | CUSHION (M)                            |        |
| 60       | 3-924-685-01 | SPRING (AZIMUTH), COMPRESSION |        | 76       | 3-831-441-99 | CUSHION                                |        |
| 61       | 3-704-197-91 | SCREW (M1.4X1.8), LOCKING     |        | 77       | 3-030-766-12 | SHEET (MOTOR)                          |        |
| 62       | 3-375-135-01 | SCREW (1.4), SPECIAL          |        | 78       | 3-561-685-01 | SHEET (C), INSULATING                  |        |
| 63       | 3-376-177-01 | SCREW (M1.4X3.8)              |        | HE901    | 1-500-515-11 | HEAD, MAGNETIC (ERASE)                 |        |
| 64       | 3-925-107-01 | SPRING (IDLER), COMPRESSION   |        | HRP901   | 1-500-073-51 | HEAD, MAGNETIC (RECORD/PLAYBACK)       |        |
| 65       | 3-924-637-01 | GEAR (FF)                     |        | M901     | 1-763-453-21 | MOTOR, DC (CAPSTAN/REEL) (WITH PULLEY) |        |
| 66       | 3-924-673-01 | GEAR (S REEL)                 |        |          |              |  |        |

(3) MECHANISM DECK SECTION-2  
(MT-20DV-118)



| Ref. No. | Part No.     | Description              | Remark | Ref. No. | Part No.     | Description                  | Remark |
|----------|--------------|--------------------------|--------|----------|--------------|------------------------------|--------|
| 101      | 3-321-483-11 | RING, RETAINING (0.25)   |        | 116      | 3-924-633-01 | SPRING (STOP), TENSION       |        |
| 102      | 3-315-495-31 | WASHER                   |        | 117      | 3-924-622-01 | LEVER (STOP)                 |        |
| 103      | X-3370-384-1 | FLYWHEEL ASSY            |        | 118      | 3-924-643-01 | SPRING (PR), TORSION         |        |
| 104      | 3-924-623-01 | LEVER (PLAY)             |        | 119      | 3-924-684-01 | SPRING (LOCK PLATE), TENSION |        |
| 105      | 3-924-621-01 | LEVER (REW)              |        | 120      | 3-924-619-01 | LEVER (SW)                   |        |
| 106      | 3-924-620-01 | LEVER (FF)               |        | 121      | 3-924-639-01 | LEVER (CR)                   |        |
| 107      | X-3370-388-1 | TABLE ASSY, FELT         |        | 122      | 3-924-618-01 | LEVER (LOCK)                 |        |
| 108      | 3-924-642-01 | SPRING (FR), TORSION     |        | 123      | 3-925-208-01 | SPRING (REC), TENSION        |        |
| 109      | 3-924-629-01 | LEVER (DETECTION)        |        | 124      | 3-924-624-01 | LEVER (REC)                  |        |
| 110      | 3-925-207-01 | SPRING (S. OFF), TENSION |        | 125      | X-3372-155-1 | CHASSIS ASSY                 |        |
| 111      | 3-924-630-01 | LEVER (S.OFF)            |        | 126      | 3-924-613-01 | GEAR (FR)                    |        |
| 112      | X-3370-387-1 | LEVER ASSY, IDLER        |        | 127      | 3-024-378-01 | SPRING (FR LEVER), TORSION   |        |
| 113      | 3-924-682-01 | BELT (FR)                |        | 128      | 3-939-590-26 | SCREW (IB LOCK)              |        |
| 114      | X-3370-385-1 | PULLEY (FR) ASSY         |        | 129      | 3-029-566-12 | STOPPER (FF)                 |        |
| 115      | 3-924-628-01 | LEVER (FR)               |        |          |              |                              |        |

## **SECTION 8**

### **ELECTRICAL PARTS LIST**

## MAIN

**NOTE:**

- Due to standardization, replacements in the parts list may be different from the parts specified in the diagrams or the components used on the set.
- -XX and -X mean standardized parts, so they may have some difference from the original one.
- **RESISTORS**  
All resistors are in ohms.  
METAL: Metal-film resistor.  
METAL OXIDE: Metal oxide-film resistor.  
F: nonflammable
- Abbreviation  
1E: No indication of country of origin

- Items marked “\*” are not stocked since they are seldom required for routine service. Some delay should be anticipated when ordering these items.
- **SEMICONDUCTORS**  
In each case,  $u$ :  $\mu$ , for example:  
 $uA\ldots : \mu A\ldots$        $uPA\ldots : \mu PA\ldots$   
 $uPB\ldots : \mu PB\ldots$        $uPC\ldots : \mu PC\ldots$   
 $uPD\ldots : \mu PD\ldots$
- **CAPACITORS**  
 $uF: \mu F$
- **COILS**  
 $uH: \mu H$

The components identified by mark  $\triangle$  or dotted line with mark  $\triangle$  are critical for safety.  
Replace only with part number specified.

Les composants identifiés par une marque  $\Delta$  sont critiques pour la sécurité.  
Ne les remplacer que par une pièce portant le numéro spécifié.

When indicating parts by reference number, please include the board.

| Ref. No. | Part No.     | Description          |          | Remark |      | Ref. No.       | Part No.     | Description                      |                 | Remark |            |  |
|----------|--------------|----------------------|----------|--------|------|----------------|--------------|----------------------------------|-----------------|--------|------------|--|
| *        | A-3021-314-A | MAIN BOARD, COMPLETE |          | *****  |      | C142           | 1-163-009-11 | CERAMIC CHIP                     | 0.001uF         | 10%    | 50V        |  |
|          |              |                      |          |        |      | C143           | 1-163-009-11 | CERAMIC CHIP                     | 0.001uF         | 10%    | 50V        |  |
|          | 3-924-741-01 | TERMINAL, PLUS       |          |        |      | C144           | 1-163-009-11 | CERAMIC CHIP                     | 0.001uF         | 10%    | 50V        |  |
|          |              | < CAPACITOR >        |          |        |      | C145           | 1-163-009-11 | CERAMIC CHIP                     | 0.001uF         | 10%    | 50V        |  |
| C101     | 1-163-809-11 | CERAMIC CHIP         | 0.047uF  | 10%    | 25V  | C146           | 1-163-251-11 | CERAMIC CHIP                     | 100PF           | 5%     | 50V        |  |
| C102     | 1-164-161-11 | CERAMIC CHIP         | 0.0022uF | 10%    | 100V | C147           | 1-163-009-11 | CERAMIC CHIP                     | 0.001uF         | 10%    | 50V        |  |
| C103     | 1-109-982-11 | CERAMIC CHIP         | 1uF      | 10%    | 10V  | C148           | 1-164-492-11 | CERAMIC CHIP                     | 0.15uF          | 10%    | 16V        |  |
| C104     | 1-135-201-11 | TANTALUM CHIP        | 10uF     | 20%    | 4V   | C149           | 1-163-009-11 | CERAMIC CHIP                     | 0.001uF         | 10%    | 50V        |  |
| C105     | 1-135-201-11 | TANTALUM CHIP        | 10uF     | 20%    | 4V   | < CONNECTOR >  |              |                                  |                 |        |            |  |
| C106     | 1-163-009-11 | CERAMIC CHIP         | 0.001uF  | 10%    | 50V  | CN101          | 1-580-919-11 | JACK, DC (POLARITY UNIFIED TYPE) |                 |        | (DC IN 3V) |  |
| C107     | 1-107-725-11 | CERAMIC CHIP         | 0.1uF    | 10%    | 16V  | < DIODE >      |              |                                  |                 |        |            |  |
| C108     | 1-163-017-00 | CERAMIC CHIP         | 0.0047uF | 5%     | 50V  | D101           | 8-719-057-27 | LED                              | L-132XHD (BATT) |        |            |  |
| C109     | 1-163-001-11 | CERAMIC CHIP         | 220PF    | 10%    | 50V  | < IC >         |              |                                  |                 |        |            |  |
| C110     | 1-109-982-11 | CERAMIC CHIP         | 1uF      | 10%    | 10V  | IC101          | 8-759-492-49 | IC                               | LA4168ML-TE-L   |        |            |  |
| C111     | 1-135-151-21 | TANTALUM CHIP        | 4.7uF    | 20%    | 4V   | < JACK >       |              |                                  |                 |        |            |  |
| C112     | 1-163-017-00 | CERAMIC CHIP         | 0.0047uF | 5%     | 50V  | J101           | 1-766-847-12 | JACK (MIC PLUG IN POWER)         |                 |        |            |  |
| C113     | 1-164-005-11 | CERAMIC CHIP         | 0.47uF   | 25V    |      | J102           | 1-766-847-12 | JACK (EAR)                       |                 |        |            |  |
| C114     | 1-164-346-11 | CERAMIC CHIP         | 1uF      | 16V    |      | < TRANSISTOR > |              |                                  |                 |        |            |  |
| C116     | 1-164-346-11 | CERAMIC CHIP         | 1uF      | 16V    |      | Q101           | 8-729-800-37 | TRANSISTOR                       | 2SD1048-X7      |        |            |  |
| C117     | 1-163-009-11 | CERAMIC CHIP         | 0.001uF  | 10%    | 50V  | Q102           | 8-729-402-84 | TRANSISTOR                       | XN4601          |        |            |  |
| C118     | 1-164-489-11 | CERAMIC CHIP         | 0.22uF   | 10%    | 16V  | Q103           | 8-729-420-50 | TRANSISTOR                       | UN5215          |        |            |  |
| C119     | 1-164-489-11 | CERAMIC CHIP         | 0.22uF   | 10%    | 16V  | Q104           | 8-729-230-72 | TRANSISTOR                       | 2SA1362YG       |        |            |  |
| C120     | 1-126-153-11 | ELECT                | 22uF     | 20%    | 6.3V | Q105           | 8-729-230-63 | TRANSISTOR                       | 2SC4116-YG      |        |            |  |
| C121     | 1-163-009-11 | CERAMIC CHIP         | 0.001uF  | 10%    | 50V  | < RESISTOR >   |              |                                  |                 |        |            |  |
| C122     | 1-126-153-11 | ELECT                | 22uF     | 20%    | 6.3V | Q106           | 8-729-800-37 | TRANSISTOR                       | 2SD1048-X7      |        |            |  |
| C123     | 1-124-257-00 | ELECT                | 2.2uF    | 20%    | 50V  | Q107           | 8-729-420-53 | TRANSISTOR                       | UN5115          |        |            |  |
| C124     | 1-124-259-11 | ELECT                | 4.7uF    | 20%    | 16V  | Q108           | 8-729-402-93 | TRANSISTOR                       | UN5214-TX       |        |            |  |
| C125     | 1-124-434-00 | ELECT                | 220uF    | 20%    | 4V   | Q109           | 8-729-420-53 | TRANSISTOR                       | UN5115          |        |            |  |
| C126     | 1-164-346-11 | CERAMIC CHIP         | 1uF      | 16V    |      | Q110           | 8-729-420-50 | TRANSISTOR                       | UN5215          |        |            |  |
| C127     | 1-124-434-00 | ELECT                | 220uF    | 20%    | 4V   | Q111           | 8-729-402-93 | TRANSISTOR                       | UN5214-TX       |        |            |  |
| C128     | 1-124-433-00 | ELECT                | 100uF    | 20%    | 4V   | Q112           | 8-729-420-50 | TRANSISTOR                       | UN5215          |        |            |  |
| C129     | 1-126-153-11 | ELECT                | 22uF     | 20%    | 6.3V | < RESISTOR >   |              |                                  |                 |        |            |  |
| C130     | 1-163-038-00 | CERAMIC CHIP         | 0.1uF    | 25V    |      | R101           | 1-216-065-00 | RES-CHIP                         | 4.7K            | 5%     | 1/10W      |  |
| C132     | 1-164-346-11 | CERAMIC CHIP         | 1uF      | 16V    |      | R102           | 1-216-053-00 | METAL CHIP                       | 1.5K            | 5%     | 1/10W      |  |
| C133     | 1-135-151-21 | TANTALUM CHIP        | 4.7uF    | 20%    | 4V   | R103           | 1-216-069-00 | METAL CHIP                       | 6.8K            | 5%     | 1/10W      |  |
| C134     | 1-164-182-11 | CERAMIC CHIP         | 0.0033uF | 10%    | 50V  | R104           | 1-216-073-00 | METAL CHIP                       | 10K             | 5%     | 1/10W      |  |
| C136     | 1-164-346-11 | CERAMIC CHIP         | 1uF      | 16V    |      |                |              |                                  |                 |        |            |  |
| C137     | 1-164-346-11 | CERAMIC CHIP         | 1uF      | 16V    |      |                |              |                                  |                 |        |            |  |
| C138     | 1-164-346-11 | CERAMIC CHIP         | 1uF      | 16V    |      |                |              |                                  |                 |        |            |  |
| C139     | 1-164-505-11 | CERAMIC CHIP         | 2.2uF    | 16V    |      |                |              |                                  |                 |        |            |  |
| C140     | 1-163-009-11 | CERAMIC CHIP         | 0.001uF  | 10%    | 50V  |                |              |                                  |                 |        |            |  |
| C141     | 1-163-009-11 | CERAMIC CHIP         | 0.001uF  | 10%    | 50V  |                |              |                                  |                 |        |            |  |

| Ref. No.              | Part No.     | Description                         |      | Remark | Ref. No. | Part No.     | Description                               | Remark                                 |
|-----------------------|--------------|-------------------------------------|------|--------|----------|--------------|---|--|
| R105                  | 1-216-049-11 | RES-CHIP                            | 1K   | 5%     | 1/10W    |              | < THERMISTOR >                            |  |
| R106                  | 1-216-049-11 | RES-CHIP                            | 1K   | 5%     | 1/10W    | THP601       | 1-810-007-11                              | THERMISTOR, POSITIVE                   |
| R108                  | 1-216-085-00 | METAL CHIP                          | 33K  | 5%     | 1/10W    | THP602       | 1-809-350-21                              | THERMISTOR, NTC (2125)                 |
| R109                  | 1-216-037-00 | METAL CHIP                          | 330  | 5%     | 1/10W    | *****        | *****                                     | *****                                  |
| R110                  | 1-216-037-00 | METAL CHIP                          | 330  | 5%     | 1/10W    | *            | 1-676-967-11                              | SW BOARD                               |
| R111                  | 1-216-069-00 | METAL CHIP                          | 6.8K | 5%     | 1/10W    | *****        | *****                                     | *****                                  |
| R112                  | 1-216-073-00 | METAL CHIP                          | 10K  | 5%     | 1/10W    |              | < SWITCH >                                |  |
| R113                  | 1-216-089-00 | RES-CHIP                            | 47K  | 5%     | 1/10W    |              |   |  |
| R114                  | 1-216-081-00 | METAL CHIP                          | 22K  | 5%     | 1/10W    | S601         | 1-571-277-51                              | SWITCH, SLIDE (REC TIME)               |
| R115                  | 1-216-065-00 | RES-CHIP                            | 4.7K | 5%     | 1/10W    | *****        | *****                                     | *****                                  |
| R116                  | 1-216-089-00 | RES-CHIP                            | 47K  | 5%     | 1/10W    |              |   |  |
| R117                  | 1-216-065-00 | RES-CHIP                            | 4.7K | 5%     | 1/10W    |              | MISCELLANEOUS                             |  |
| R118                  | 1-216-009-00 | RES-CHIP                            | 22   | 5%     | 1/10W    |              | *****                                     | *****                                  |
| R119                  | 1-216-121-00 | RES-CHIP                            | 1M   | 5%     | 1/10W    | HE901        | 1-500-515-11                              | HEAD, MAGNETIC (ERASE)                 |
| R122                  | 1-216-081-00 | METAL CHIP                          | 22K  | 5%     | 1/10W    | HRP901       | 1-500-073-51                              | HEAD, MAGNETIC (RECORD/PLAYBACK)       |
| R123                  | 1-216-057-00 | METAL CHIP                          | 2.2K | 5%     | 1/10W    | M901         | 1-763-453-21                              | MOTOR, DC (CAPSTAN/REEL) (WITH PULLEY) |
| R125                  | 1-216-065-00 | RES-CHIP                            | 4.7K | 5%     | 1/10W    | MIC101       | 1-542-136-11                              | MICROPHONE, ELECTRET CONDENSER (MIC)   |
| R126                  | 1-216-033-00 | METAL CHIP                          | 220  | 5%     | 1/10W    | SP901        | 1-505-838-11                              | SPEAKER (3.6cm)                        |
| R127                  | 1-216-053-00 | METAL CHIP                          | 1.5K | 5%     | 1/10W    | *****        | *****                                     | *****                                  |
| R129                  | 1-216-097-00 | RES-CHIP                            | 100K | 5%     | 1/10W    |              | ACCESSORIES & PACKING MATERIALS           |  |
| R130                  | 1-216-061-00 | METAL CHIP                          | 3.3K | 5%     | 1/10W    | *****        | *****                                     | *****                                  |
| R131                  | 1-216-077-00 | RES-CHIP                            | 15K  | 5%     | 1/10W    | △            | 1-528-405-31                              | ADAPTOR, BATTERY CHARGE                |
| R132                  | 1-216-061-00 | METAL CHIP                          | 3.3K | 5%     | 1/10W    |              | (BCA-35E) (22DV)                          |  |
| R133                  | 1-216-045-00 | METAL CHIP                          | 680  | 5%     | 1/10W    | △            | 1-542-307-11                              | MICROPHONE (ECM-J2SL) (21DV)           |
| R134                  | 1-216-061-00 | METAL CHIP                          | 3.3K | 5%     | 1/10W    |              | 1-693-073-21                              | ADAPTOR, AC (AC-E350) (22DV)           |
| R135                  | 1-216-105-00 | RES-CHIP                            | 220K | 5%     | 1/10W    | △            | 1-756-035-31                              | BATTERY PACK (NC-WMAA) (22DV)          |
| R136                  | 1-216-097-00 | RES-CHIP                            | 100K | 5%     | 1/10W    |              | 3-044-622-01                              | POUCH, CARRYING (21DV)                 |
| R137                  | 1-216-073-00 | METAL CHIP                          | 10K  | 5%     | 1/10W    |              |   |  |
| R138                  | 1-216-097-00 | RES-CHIP                            | 100K | 5%     | 1/10W    | 3-868-083-11 | MANUAL, INSTRUCTION                       |  |
| R139                  | 1-216-105-00 | RES-CHIP                            | 220K | 5%     | 1/10W    |              | (ENGLISH, FRENCH, SPANISH) (US, Canadian) |  |
| R141                  | 1-216-073-00 | METAL CHIP                          | 10K  | 5%     | 1/10W    | 3-868-083-21 | MANUAL, INSTRUCTION                       |  |
| R142                  | 1-216-025-00 | RES-CHIP                            | 100  | 5%     | 1/10W    |              | (ENGLISH, SPANISH, PORTUGUESE) (E)        |  |
| R143                  | 1-216-065-00 | RES-CHIP                            | 4.7K | 5%     | 1/10W    | 3-868-083-31 | MANUAL, INSTRUCTION                       |  |
| R144                  | 1-216-017-00 | RES-CHIP                            | 47   | 5%     | 1/10W    |              | (GERMAN, ITALIAN, HUNGARIAN) (21DV: E)    |  |
| R201                  | 1-216-009-00 | RES-CHIP                            | 22   | 5%     | 1/10W    | 3-868-083-41 | MANUAL, INSTRUCTION                       |  |
| R601                  | 1-216-081-00 | METAL CHIP                          | 22K  | 5%     | 1/10W    |              | (FRENCH, GERMAN, ITALIAN) (20DV: E)       |  |
| R602                  | 1-216-049-11 | RES-CHIP                            | 1K   | 5%     | 1/10W    | 3-868-083-51 | MANUAL, INSTRUCTION                       |  |
| R603                  | 1-216-053-00 | METAL CHIP                          | 1.5K | 5%     | 1/10W    |              | (DUTCH, SWEDISH, FINNISH) (20DV: E)       |  |
| R604                  | 1-216-077-00 | RES-CHIP                            | 15K  | 5%     | 1/10W    | 3-868-083-61 | MANUAL, INSTRUCTION (POLISH, CZECH,       |  |
| R606                  | 1-216-097-00 | RES-CHIP                            | 100K | 5%     | 1/10W    |              | SLOVAKIAN) (20DV: EE/21DV: E)             |  |
| R607                  | 1-216-081-00 | METAL CHIP                          | 22K  | 5%     | 1/10W    | 3-868-083-71 | MANUAL, INSTRUCTION (ENGLISH, CHINESE)    |  |
| R609                  | 1-216-053-00 | METAL CHIP                          | 1.5K | 5%     | 1/10W    |              | (20DV: 1E/23DV: 1E)                       |  |
| R610                  | 1-216-057-00 | METAL CHIP                          | 2.2K | 5%     | 1/10W    | 3-868-083-81 | MANUAL, INSTRUCTION (ENGLISH, CHINESE)    |  |
|                       |              |                                     |      |        |          |              |   | (20DV: CHINESE)                        |
|                       |              |                                     |      |        |          | 3-868-083-91 | MANUAL, INSTRUCTION                       |  |
|                       |              |                                     |      |        |          |              | (ENGLISH, RUSSIAN, HUNGARIAN) (20DV: EE)  |  |
|                       |              |                                     |      |        |          | 8-814-296-90 | MICROPHONE, CONDENSER ECM-TC60            |  |
|                       |              |                                     |      |        |          |              |   | (23DV)                                 |
| < VARIABLE RESISTOR > |              |                                     |      |        |          |              |   |  |
| RV101                 | 1-227-166-11 | RES, VAR, CARBON (VOL ▲)            |      |        |          |              |   |  |
| RV601                 | 1-223-583-11 | RES, ADJ, CARBON 1K                 |      |        |          |              |   |  |
| RV602                 | 1-225-598-11 | RES, VAR, CARBON 2K (SPEED CONTROL) |      |        |          |              |   |  |
| RV603                 | 1-223-587-11 | RES, ADJ, CARBON 22K                |      |        |          |              |   |  |
| < SWITCH >            |              |                                     |      |        |          |              |   |  |
| S101                  | 1-771-321-11 | SWITCH, SLIDE (REC/PB)              |      |        |          |              |   |  |
| S102                  | 1-572-688-11 | SWITCH, PUSH (1 KEY) (POWER)        |      |        |          |              |   |  |
| S104                  | 1-692-605-31 | SWITCH, SLIDE (VOR)                 |      |        |          |              |   |  |
| S105                  | 1-572-922-11 | SWITCH, SLIDE (PAUSE ▲)             |      |        |          |              |   |  |

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| The components identified by mark ▲ or dotted line with mark △ are critical for safety. Replace only with part number specified. | Les composants identifiés par une marque ▲ sont critiques pour la sécurité. Ne les remplacer que par une pièce portant le numéro spécifié. |
|--|--|